

the rarest or most out-of-the-way animals can be fished up at five minutes' notice, and the time of appearance of this or that form, of the eggs of another, of the larvæ of another, is so precisely ascertained that the zoologist can go—not in his present hap-hazard fashion, to study anything which may turn up—but definitely primed and prepared to settle an important question in relation to a form which he is sure to obtain.

These advantages, and the honour of being the first University to possess a sea-side laboratory of its own, cannot be secured by the Johns Hopkins University without a certain definite outlay of money. What may be the cost of buildings and of permanently employing a fisherman, two attendants, and a scientific director in the United States, it is difficult to guess, but nothing less than an expenditure of 5,000*l.* on the building and an annual outlay of 700*l.* would give such an experiment a fair chance of success in this country.

E. RAY LANKESTER

#### THE SOLUBILITY OF GASES IN SOLIDS

MESSRS. HANNAY and Hogarth recently communicated to the Royal Society an important paper on the Solubility of Solids in Gases. The subject, an outline of which was given to our readers in an abstract of a preliminary paper by the same authors a few weeks ago, has attracted the more notice since it led Mr. Hannay to the research upon the artificial production of crystallised carbon, which is associated with his name.

The original purpose of Messrs. Hannay and Hogarth in undertaking this research was to investigate the condition of gases at their "critical point" with respect to their solvent power. For if at the critical point there really occurs a transition from liquid to gaseous state, and if the property of solids is one possessed by liquids alone, there ought to be precipitation of the dissolved solid matter as the substance passes through the critical point. If no such precipitation occurred, this would furnish an independent proof of the perfect continuity of the liquid and gaseous states, in addition to the proofs derived from the observed relations of temperature and pressure, and from the inability of optical tests to discriminate between gas and liquid in the condition of matter raised above its critical temperature.

A simple qualitative experiment was therefore undertaken as a preliminary test of the matter. "A solution of potassic iodide in alcohol was prepared, and a strong tube filled to about one-half with the solution. After sealing the tube was placed in an air-bath, and heat applied. No precipitation of solid could be seen even at a temperature of 350° C., more than 100° C. above the critical point of alcohol." A solution of resin in paraffin spirit showed no trace of decomposition at 360° C. under similar conditions.

To permit of experimenting under more exact conditions, a modification of Andrews's apparatus was devised, which, from its simplicity and efficiency deserves mention. A T-tube of wrought-iron of  $\frac{1}{2}$ -inch internal and 1-inch external diameter was furnished with wrought-iron screw caps. Through one of these the pressure-screw works; through the opposite end the experimental tube is fixed. The side-branch, about 3 inches long, admitted an air-manometer. The apparatus, which was less than 12 inches in length, was filled with mercury. The device for packing consisted in the employment of stout india-rubber plugs. Where the pressure-screw passed through the rubber the latter was protected by a greased leather lining. When high pressures were employed the tube was cemented in with oxychloride of zinc. This extremely simple method of packing was so perfect as to give freedom of motion without leakage even at the enormous pressure of 880 atmospheres.

With this apparatus it was demonstrated that a clean

crystal of potassic iodide dissolved gradually away in pure alcohol gas (the term *gas* referring, as Andrews suggested, to the fluid, at any temperature *above* its critical point). Bromide of potassium, and chloride of calcium were also found to be soluble in alcohol gas. Cobaltous chloride remained in solution at 320° C., and continued to exhibit its characteristic blue colour. It even showed a spectrum identical with that shown at 15° C. The spectrum of the acid decomposition product of chlorophyll similarly dissolved in alcohol, gives identical spectra at 350° C., and 15° C., though in air it decomposes below 200° C.

Other experiments with sulphur, selenium, and arsenic in bisulphide of carbon gave interesting but less conclusive results. The question whether the critical point of a gas is altered by having a solid dissolved in it appears to be affirmatively decided; for the authors found that while the critical point of pure alcohol is 234·6 C. at a pressure of that of 65 atmospheres, alcohol containing potassic iodide was 237° at a pressure of 71·1 atmospheres.

Further attempts were made to obtain solutions of sodium in ammonia, gas, and hydrogen, in the latter case with partial success.

As a final conclusion the authors claim that these experiments, made at temperatures much further removed from the critical point than those from which Andrews reasoned, afford further proof of the perfect continuity of the liquid and gaseous states, and also complete proof of the solubility of solids in gases.

#### THE LATE MR. THOMAS BELL, F.R.S.

TO few men does English biological science owe more than to the veteran zoologist whose death we briefly recorded in NATURE, vol. xxi. p. 473. Born at Poole, in Dorsetshire, on October 11, 1792, Thomas Bell was educated as a surgeon-dentist, and on his establishment in practice in London he soon gained a high professional reputation. From an early period of life he devoted his leisure hours to zoological studies, and the fruits of his careful and conscientious labours are preserved in his numerous contributions to the *Transactions* and *Proceedings* of the Linnean, Geological, and Zoological Societies, and in his well-known manuals on "British Quadrupeds," "Reptiles," and "Stalk-eyed Crustacea." These latter formed part of the series of works published by Mr. Van Voorst, which have done so much to spread a knowledge of the natural history of our islands; and Mr. Bell was specially adapted to such a task, having a happy faculty of conveying scientific information in such a form as to be attractive to the general reader. A still more important undertaking was his illustrated folio, "Monograph of the Testudinata," begun in 1836, but unfortunately the publisher failed when only eight parts had appeared; the plates, along with some which had remained unpublished, were re-issued to the public in 1872 by Mr. Sothern, with letterpress by the late Dr. J. E. Gray.

But the services which Mr. Bell rendered to science were far from being confined to his published writings. From 1848 to 1853 he was one of the secretaries of the Royal Society, of which he had been elected a Fellow in 1828, and his business habits, energy, and personal popularity enabled him greatly to advance its interests. On his resigning this secretaryship in 1853 he was elected President of the Linnean Society, of which body he had been a member since 1815. Neither the scientific standing nor the financial position of the Society were then in a state at all worthy of its name and traditions, and the new President set vigorously to work at its reform. By personal example and influence in procuring suitable papers and in assuring good attendances, by an active enlistment of new members, and a rigorous supervision of expenditure, and by generous private donations to the

funds, Mr. Bell was completely successful in his object. Up to nearly the close of his long life he was in the habit of coming to town to attend the anniversary meetings of a society of which he may almost be called the second founder.

In 1866 Mr. Bell purchased The Wakes, Selborne, from the grand-nieces of Gilbert White, and the last twenty years were spent by him there in peaceful retirement, but not in idleness. Giving up systematic scientific work, as well as professional practice, he devoted the long evening of his life to observation in the field, especially of birds and plants, and to the reverent study of the life and labours of the famous historian of his adopted home. Only three years ago, at the age of eighty-five, he published an edition of the "Natural History of Selborne," which may safely be said to be by far the best of the numerous issues of that classic work.

In his Hampshire retreat, as in the heat and bustle of metropolitan life, Mr. Bell retained all the charm of manner and fine qualities both of heart and mind, which endeared him to all who had the privilege of knowing him; and up till very recently his robust health enabled him to bear the weight of years lightly as an honour rather than a burden. Under Gilbert White's roof-tree he died peacefully on Saturday, the 13th instant. By his death the scientific world seems to have lost one of its last links with a generation of good and faithful workers whose labours are too apt to be overlooked in the stir and struggle of controversies of the day.

#### NOTES

WE continue this week, by the courtesy of General Myer, our monthly series of Meteorological Charts for the Northern Hemisphere, compiled by the U.S. Signal Office. The present map shows the mean pressure, temperature, force, and direction of wind for June, 1878. To meteorologists the lessons of the chart will be plain; the next one which we issue we hope to accompany by an article explanatory of the purposes and utility of the whole series.

AFTER Easter the Royal Society is to meet at half-past four in the afternoon instead of half-past eight in the evening.

THE keepership of the mineralogical department of the British Museum has become vacant by the resignation of Prof. Story-Maskelyne, F.R.S., who is a candidate for the representation of Cricklade in the new Parliament.

THE work of casting the lenses of the great refracting telescope of the Paris Observatory has already begun at Feil's establishment. The founding of the flint disc has taken five days, and the annealing a full month. A like operation will soon take place for the Bishofsheim Observatory instrument.

THE *Melbourne Argus* says:—"The Count de Castelnau, for many years French Consul at Melbourne, died yesterday (February 4) at his residence, Apsley-place, East Melbourne. The deceased gentleman was an ardent student of natural history, and had pursued his studies in the various parts of the world whither his official duties led him. He was director of the Scientific Expedition sent by Louis Philippe, the King of the French, to South America, and was afterwards French Consul in divers parts of the southern hemisphere. While at the Cape of Good Hope he wrote a "Memoire sur les Poissons de l'Afrique Australe." When he returned to Europe and began to put his voluminous notes in order, he made the disheartening discovery that while he had been temporarily disabled his servant had been for more than a month in the habit of using the sheets of paper on which he had bestowed so much time and labour to light the fires. He disposed of the remainder of his notes and drawings to Prof. Lacordaire, and about 1862 arrived in Melbourne, where

he has since resided. Count Castelnau was an active member of the Zoological and Acclimatisation Society of Victoria. He contributed several valuable papers on the fishes of Australia, which have been published by the Society, and are recognised by naturalists as works of authority on the subject."

THE American Philosophical Society of Philadelphia, the oldest scientific society in America, celebrated the one hundredth anniversary of its incorporation by a public dinner at the St. George Hotel, on March 15. The Society was founded May 25, 1743, and incorporated March 15, 1780.

AN American correspondent writes that on March 30 and 31 the ninth annual meeting of the American Fish Cultural Association takes place. This association is by no means local in its character, but has extended fish culture all over the United States. It was through its exertions that the Government was induced to form the U.S. Fish Commission, with the secretary of the Smithsonian at its head. Among the members of the Association are found most of the leading ichthyologists in the United States, with all of the Canadian officers who have Her Majesty's Provincial Fisheries under their charge.

A TELEPHONIC line has been formed between the meteorological station on the Pic du Midi and Bagneres-de-Bigorre (30 kilometres distance). General de Nansouty writes in high terms of the Edison telephone, which he is using.

THE Observatory at Mannheim has been removed to Karlsruhe.

THE Vesuvius railway from the observatory to the crater will be opened in April.

A CORRESPONDENT of *La Nature* sends that paper a photograph of a curious phenomenon met with in the cold of December last. It shows a bottle which contained a solution of nitrate of silver (1 per cent.). The cork is forced out and imprisoned at the extremity of a long cylinder of ice, due to increase of the volume of the mass in freezing. The bottle was also cracked, and several pieces detached.

THE cold room established by Tellier at the Conservatoire des Arts et Metiers for the fabrication of standard metres and kilogrammes on behalf of the several foreign governments in the international union, is not to be discontinued when the International Observatory at St. Cloud is finished. The apparatus will be sold to the French Government and used by it for the fabrication and comparison of standard kilograms and metres to be used in the several public conservatoires of France and the Colonies.

THE annual meeting of the West London Scientific Association was held on Tuesday, followed by a *soirée* and a varied and interesting exhibition.

THERE was a shock of earthquake on Monday at Poitiers and Chatellerault.

A NUMBER of pneumatic clocks have been installed by a Viennese speculator on the Paris Boulevards for the distribution of the time, in competition with the electric system advocated by Leverrier and now in course of experimentation. Three systems, Breguet's, Garnier's, and Redier's, which have been successful in a first competition, are to be tested successively.

IT may be noted in confirmation of the theories advocated by Mr. Blandford in our last issue, that the period of north winds, clear skies, and high pressure set in in France in October 1878, and has continued without any long interruption up to the present moment. The date of the beginning of that remarkable period is almost the same as the end of the high-pressure period noted in India and the great Archipelago of Asia.